All India Test Series (2023-24)

Test Code: ANY/07

AITS TEST - 07

YAKEEN NEET

DURATION: 200 Minutes | **DATE: 14/04/2024** | **M. MARKS: 720**

Topics Covered

Physics:	Full Syllabus.
Chemistry:	Full Syllabus.
Botany:	Full Syllabus.
Zoology:	Full Syllabus.

General Instructions:

1. Immediately fill in the particulars on this page of the test booklet.
2. The test is of **3 hours 20 minutes** duration and the Test Booklet contains **200** multiple choice questions (four options with a single correct answer) from **Physics, Chemistry and Biology (Botany and Zoology)**. **50** questions in each subject are divided into **two sections (A and B)** as per details given below:
   (a) **Section A** shall consist of **35 (Thirty-five)** Questions in each subject (Question Nos. – 1 to 35, 51 to 85, 101 to 135 and 151 to 185). All Questions are compulsory.
   (b) **Section B** shall consist of **15 (Fifteen)** questions in each subject (Question Nos. – 36 to 50, 86 to 100, 136 to 150 and 186 to 200). In section B, a candidate needs to **attempt any 10 (Ten)** questions out of **15 (Fifteen)** in each subject.
   Candidates are advised to read all 15 questions in each subject of Section-B before they start attempting the question paper. In the event of a candidate attempting more than ten questions, **the first ten questions answered by the candidate shall be evaluated.**
3. There is only one correct response for each question.
4. Each **correct** answer will give **4 Mark** while **1 Mark** will be **deducted** for a **wrong** answer. The maximum marks are 720.
5. No student is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device, etc. inside the examination room/hall.
6. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. However, the candidates are allowed to take away this Test Booklet with them.

OMR Instructions:

1. Use blue/black dark ballpoint pen.
2. Darken the bubbles completely. Don't put a tick mark or a cross mark where it is specified that you fill the bubbles completely. Half-filled or over-filled bubbles will not be read by the software.
3. Never use pencils to mark your answers.
4. Never use whiteners to rectify filling errors as they may disrupt the scanning and evaluation process.
5. Writing on the OMR Sheet is permitted on the specified area only and even small marks other than the specified area may create problems during the evaluation.
6. Multiple markings will be treated as invalid responses.
7. **Do not fold or make any stray mark on the Answer Sheet (OMR).**

Name of the Student (In CAPITALS): _____

Roll Number: _____

OMR Bar Code Number: _____

Student's Signature: _____ Invigilator's Signature _____

(PHYSICS)

SECTION-A

1. The dimensional formula of pressure gradient, (pressure variation with depth in a container), can be described as;

(1) $\left[ML^{-3}T^{-2}\right]$

(2) $\left[ML^{-2}T^{-2}\right]$

(3) $\left[ML^{-4}T^{-2}\right]$

(4) $\left[MLT^{-4}\right]$

2. A particle located at origin at time $t = 0$, starts moving along positive y direction with a velocity v that varies as $v = \sqrt{y}$. The displacement of the particle varies with time as;

(1) $\frac{t^3}{3}$ (2) $\frac{t^{-2}}{2}$

(3) $\frac{t^2}{4}$ (4) $2t$

3. If photons of energy 1 eV and 2.5 eV respectively are incident on same metallic plate of work function 0.5 eV, one after another, then ratio of maximum kinetic energy of photoelectrons emitted by them will be;

(1) $\frac{1}{2}$ (2) $\frac{1}{3}$

(3) $\frac{1}{4}$ (4) $\frac{1}{6}$

4. A sphere of radius $2R$ and charge $3Q$ is placed inside a concentric imaginary sphere of radius $3R$. The flux associated with the imaginary sphere is;

(1) $\frac{3Q}{\varepsilon_0}$ (2) $\frac{Q}{3\varepsilon_0}$

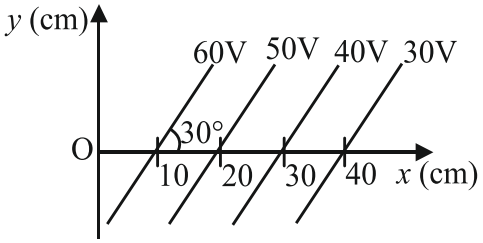
(3) $\frac{6Q}{\varepsilon_0}$ (4) zero

5. A block of mass 30 kg is placed on a rough horizontal surface with a coefficient of friction $\mu_s = 0.5$. If a horizontal force of 125 N acts on the block, then the acceleration of the block will be; (Take $g = 10\ m/s^2$)

(1) $1\ m/s^2$ (2) $0\ m/s^2$

(3) $\frac{5}{6}\ m/s^2$ (4) $5\ m/s^2$

6. Some equipotential surface in space are as shown in figure. The magnitude and direction of electric field in the region is;



(1) 200 V/m, 60° in clockwise direction from positive x-axis.

(2) 100 V/m, 60° in anticlockwise direction from positive x-axis.

(3) 200 V/m, 120° in anticlockwise direction from positive x-axis.

(4) 100 V/m, 120° in clockwise direction from positive x-axis.

7. A ball hits the floor and rebounds after an inelastic collision. In this case,

(1) the momentum of the ball just after the collision is the same as that just before the collision

(2) the mechanical energy of the ball just after the collision remains the same just before the collision

(3) the total momentum of the ball and the earth is conserved

(4) None of the above

8. The binding energies of the nuclei A and B are E_a and E_b respectively. Three atoms of element B fuse to give one atom of element A and an energy Q is released. Then E_a, E_b and Q are related as;

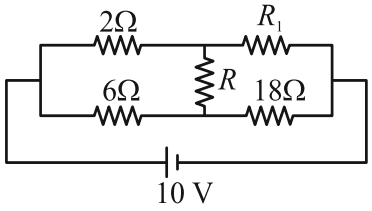
(1) $E_a - 3E_b = Q$

(2) $3E_b - E_a = Q$

(3) $E_a + 3E_b = Q$

(4) $E_b + 3E_a = Q$

9. In the given circuit shown, what could be value of R_1 for current through R to be zero?



(1) 4 Ω (2) 40 Ω

(3) 10 Ω (4) 6 Ω

10. From a circular ring of mass M and radius R, an arc corresponding to a 45° sector is removed. The moment of inertia of the remaining portion of the ring about an axis passing through the center of the ring and perpendicular to the plane of the ring is K times MR^2. The value of K will be;

(1) $\frac{3}{4}$ (2) $\frac{3}{5}$

(3) $\frac{7}{8}$ (4) $\frac{3}{7}$

11. The length of a metallic rod is 5 m at 0°C and become 5.01 m on heating till 100°C. The coefficient of linear expansion of the metal will be;

(1) 2.33×10^{-5}/°C

(2) 6.0×10^{-5}/°C

(3) 4.0×10^{-5}/°C

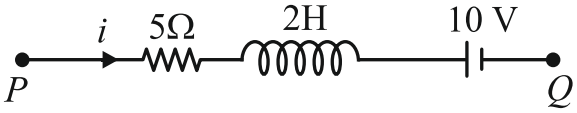
(4) 2.0×10^{-5}/°C

12. The wavelength of light travelling in vacuum is 8000 Å and in a medium is 4000 Å. The refractive index of the medium is;

(1) 1 (2) 2

(3) 3 (4) 4

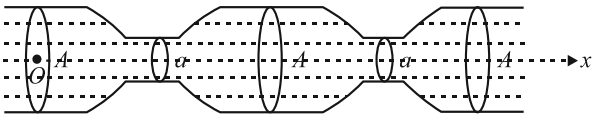
13. In the given branch PQ of a main circuit, electric current $i = (5t + 2)$ A is flowing, where t is time in second. At $t = 1$ s, the potential difference between point P and Q is;



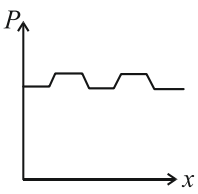
(1) Zero (2) 20 V

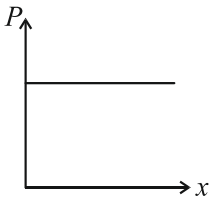
(3) 10 V (4) 55 V

14. Water flows through a horizontal frictionless tube with a varying cross-section as shown in the figure.



Pressure P changes along x-axis is best represented by the graph;

(1)


(2)


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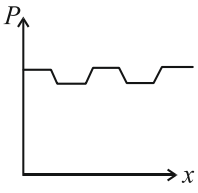

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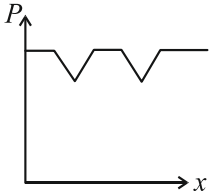


15. A cube of a substance of coefficient of volume expansion γ_1 is floating in a liquid of coefficient of volume expansion $\gamma_2 (\gamma_2 < \gamma_1)$, such that 50% of its volume is inside the liquid. If temperature of the system is now increased, then percentage of volume of cube inside the liquid may be;

(1) 50%

(2) 52%

(3) 45%

(4) 55%

16. The speed of electromagnetic wave in a medium which has relative permeability 2 and relative permittivity 8, is;

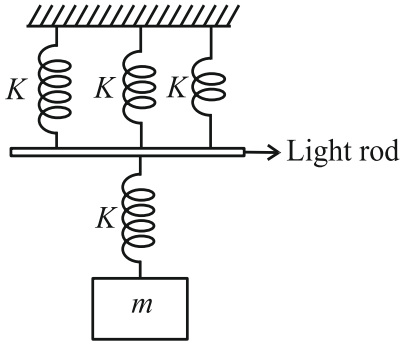
(1) 1.5×10^8 m/s

(2) 1×10^8 m/s

(3) 2.5×10^8 m/s

(4) 7.5×10^7 m/s

17. The time period of small oscillations of mass m as shown in the figure is (All springs are ideal)



(1) $2\pi\sqrt{\frac{3m}{4K}}$

(2) $2\pi\sqrt{\frac{4m}{3K}}$

(3) $2\pi\sqrt{\frac{m}{K}}$

(4) $2\pi\sqrt{\frac{8m}{3K}}$

18. In a thermodynamic process, pressure of a fixed mass of a gas is changed in such a manner that the gas molecules absorb 40 J of heat and 20 J of work is done by the gas. If the initial internal energy of the gas was 50 J, then the final internal energy will be;

(1) 50 J

(2) 20 J

(3) 70 J

(4) 30 J

19. An object is at center of curvature of a concave mirror having radius of curvature *R*. If object is displaced by $\frac{R}{2}$ away from the mirror, displacement of image will be;

(1) $\frac{5R}{8}$ towards mirror

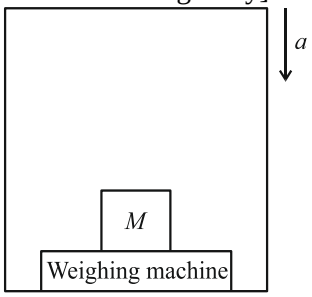
(2) $\frac{5R}{8}$ away from mirror

(3) $\frac{R}{4}$ towards mirror

(4) $\frac{R}{4}$ away from mirror

20. An elevator is descending with an acceleration *a* as shown in the figure. If block *M* exerts a force of $\frac{Mg}{5}$ on weighing machine, then value of *a* is;

[*g* = acceleration due to gravity]



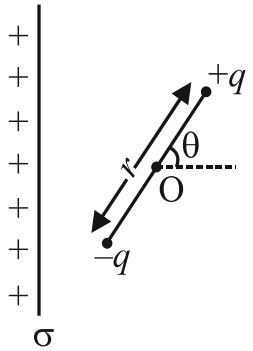
(1) 0.3 g

(2) 0.1 g

(3) 0.8 g

(4) 0.9 g

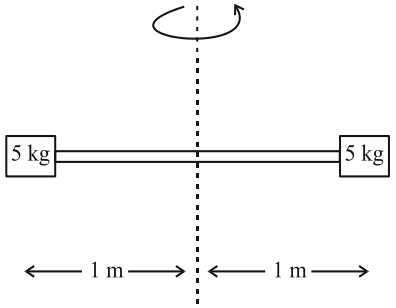
21. An infinitely large non-conducting plane sheet carries uniform surface charge density +σ. A short dipole is hinged at point *O* and makes an angle θ with normal to the sheet. The magnitude of torque experienced by the dipole at the instant shown is;



(1) $\frac{\sigma qr}{2\varepsilon_0}\sin\theta$ (2) zero

(3) $\frac{\sigma qr}{2\varepsilon_0}\cos\theta$ (4) $\frac{\sigma qr}{2\varepsilon_0}\tan 2\theta$

22. Two blocks each of mass 5 kg are connected to the ends of a light rod as shown in the figure.



The rod is rotated about a vertical line of symmetry passing through centre of rod. The rod breaks if the tension in it exceeds 400 N. The maximum frequency (in rotation per second) with which the rod may be rotated without breaking, is;

(1) $\frac{5}{\pi}$ (2) $\frac{2}{\pi}$

(3) $\frac{2\sqrt{5}}{\pi}$ (4) $\frac{2\sqrt{10}}{\pi}$

23. 1 Ampere is the amount of current that is flowing through each of two parallel long straight wires which is placed 1 m apart will give rise to a force per unit length between them is equal to;

(1) 1 N/m (2) 2×10^7 N/m

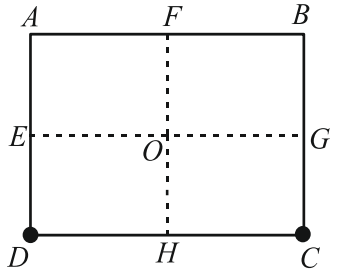
(3) $4\pi \times 10^7$ N/m (4) 2×10^{-7} N/m

24. The two plates of a parallel-plate air capacitor are 4 mm apart. A slab of dielectric constant 3 and thickness 3 mm is introduced between the plates with its faces parallel to them. The distance between the plates is adjusted such that the capacitance again becomes equal to capacitance without dielectric. The new distance between the plates is;

(1) 5 mm (2) 6 mm

(3) 8 mm (4) 9 mm

25. A uniform square plate *ABCD* has mass 10 kg. If two-point masses of 5 kg each are placed at the corners *C* and *D* as shown in the adjoining figure, then the center of mass of square plate shifts to the point which lies on line:



(1) OH (2) DH

(3) OG (4) OF

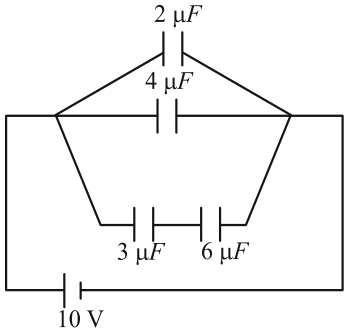
26. A short bar magnet placed with its axis at 30° with a uniform external magnetic field of 0.25T experiences a torque of magnitude equal to 0.05 N m. The magnitude of the magnetic moment of the bar magnet is;

(1) 0.2 JT^{-1}
(2) 0.4 JT^{-1}
(3) 4.0 JT^{-1}
(4) 0.64J T^{-1}

27. Magnitude of magnetic field near the end of long solenoid is B_1 and at its mid-point is B_2. The ratio $\frac{B_1}{B_2}$ is;

(1) $\frac{1}{2}$ (2) 2
(3) $\frac{1}{4}$ (4) 4

28. Energy stored in the capacitor of capacitance 4 μF connected in the circuit as shown in figure will be;



(1) 200 μJ
(2) 300 μJ
(3) 400 μJ
(4) 800 μJ

29. An aluminium wire and a steel wire of the same diameter and length are connected end to end and a longitudinal force is applied across ends of combined length, which stretched their combined length by 2 cm. The two wires will have;

(1) Different stress and strain
(2) Same stress and strain
(3) Same strain but different stress
(4) Same stress but different strain

30. The impedance of a circuit containing a resistance of 30 Ω and an inductance of $\frac{0.4}{\pi}H$ which are connected in series, for A.C. source of 50 Hz frequency is;

(1) 100 Ω (2) 70 Ω
(3) $50\sqrt{2}\,\Omega$ (4) 50 Ω

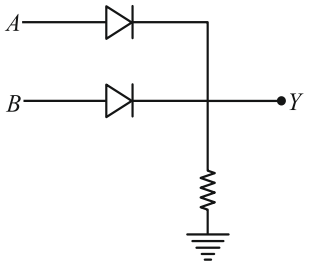
31. Mean free path of O_2 gas molecules in rigid container is λ. If temperature of gas is tripled, then new mean free path of O_2 gas molecules is;

(1) λ (2) 2λ
(3) $\frac{\lambda}{2}$ (4) $\frac{\lambda}{4}$

32. In Young's double slit experiment, the separation between 4^{th} maxima and 3^{rd} minima on the screen is n times as that of fringe width. The value of $2n$ is;

(1) 1.5 (2) 2
(3) 3 (4) 4.5

33. The truth table for the circuit shown in the figure.



(1)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

(2)

A	B	Y
0	0	1
1	0	1
0	1	1
1	1	0

(3)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

(4)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

34. An open and a closed organ pipe have the same length and are placed in same medium. The ratio of frequency of their 4^{th} overtone is;

(1) $\frac{10}{9}$ (2) 2
(3) $\frac{8}{7}$ (4) $\frac{2}{7}$

35. In which of the following transition will be wavelength corresponding to n = 3 to n = 1 be minimum?

(1) Hydrogen atom
(2) Deuterium atom
(3) Singly ionized helium
(4) Doubly ionized lithium

SECTION-B

36. In ground to ground projectile motion, the horizontal range and maximum height attained by a projectile are R and H respectively. If a constant horizontal acceleration $a = \frac{g}{6}$ is imparted to the projectile due to wind in the horizontal direction of motion of projectile, then its new horizontal range will be;

(1) $\frac{2R}{3}$ (2) $R + \frac{2H}{3}$

(3) $R + 2H$ (4) $R + \frac{H}{2}$

37. A stone of mass 1 kg tied to a light inextensible string of length $L = 2.5\,\text{m}$ is whirling in a circular path of radius L in a vertical plane. If the ratio of the maximum tension in the string to the minimum tension is 3 and if g is taken to be 10 m/s^2, the speed of the stone at the highest point of the circle is.

(1) 10 m/s (2) 20 m/s

(3) 30 m/s (4) 25 m/s

38. A ray of light incident on an equilateral prism at grazing incidence and emerges grazingly from the prism at other surface. The refractive index of the prism is;

(1) 1.5 (2) 1.8

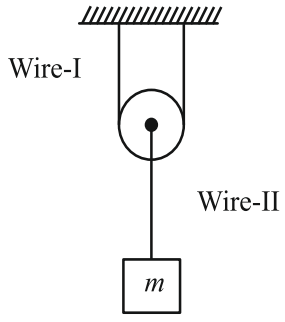
(3) 1.33 (4) 2

39. In a test experiment on a model aeroplane in a wind tunnel, the flow speeds on the upper and lower surfaces of the wing are 70 ms^{-1} and 62 ms^{-1} respectively. What is the lift force on the wing of total area 2.5 m^2? (density of air is 1.3 kg m^{-3})

(1) 1526 N (2) 1428 N

(3) 1200 N (4) 1716 N

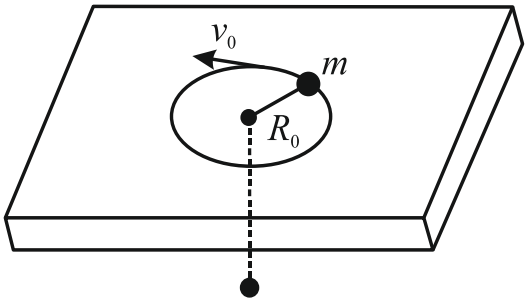
40. Two light copper wires having same length and cross-sectional area are used to hang a block as shown below. If the elongation in wire I is l, then the elongation in wire II is;



(1) l (2) $2l$

(3) $\frac{l}{2}$ (4) $\frac{l}{4}$

41. A mass m moves in a circle on a smooth horizontal plane with velocity v_0 at a radius R_0. The mass is attached to a string that passing through a smooth hole in the plane, as shown.



The tension in the string is increased gradually and finally, m moves in a circle of radius $\frac{R_0}{4}$. The final value of the kinetic energy is;

(1) mv_0^2

(2) $\frac{1}{4}mv_0^2$

(3) $8mv_0^2$

(4) $\frac{1}{8}mv_0^2$

42. A string under a tension of 129.6 N produces 10 beats/s when it is vibrated along with a tuning fork. When the tension in the string is increases to 160 N it vibrates in unison with same tuning fork. Fundamental frequency of tuning fork is;

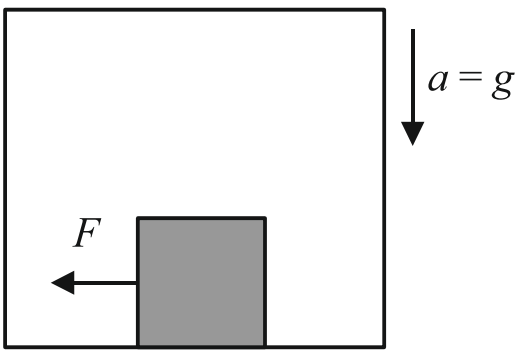
(1) 100 Hz

(2) 50 Hz

(3) 150 Hz

(4) 200 Hz

43. A block of mass m is kept on the floor of a freely falling lift. During the free fall of the lift, the block is pulled horizontally with a force of F = 5N, if $\mu_s = 0.1$. Then frictional force on the block will be;



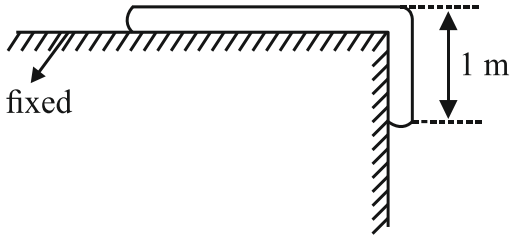
(1) 5 N

(2) 2 N

(3) zero

(4) 10 N

44. One meter of a uniform rope of length 3 m is hanging over the edge of a smooth table as shown in figure. On releasing the rope, velocity with which it just leaves the table completely is; (take $g = 10\ m/s^2$)



(1) $\sqrt{\frac{50}{3}}$ m/s

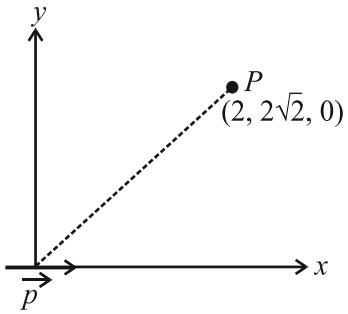
(2) $\sqrt{\frac{80}{3}}$ m/s

(3) $\sqrt{\frac{40}{3}}$ m/s

(4) $\sqrt{\frac{20}{3}}$ m/s

45. A small electric dipole is placed at origin with dipole moment directed along positive x-axis. The direction of electric field at the point '*P*' as shown in the figure will be;

$\left(\text{Given, } \tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}\right)$



(1) Along negative *z*-axis

(2) Along negative *x*-axis

(3) Along positive *y*-axis

(4) At angle $\tan^{-1}\left(\frac{1}{2}\right)$ from *x*-axis

46. An electric heater having heating coil of 484 Ω is connected with a supply voltage of 220 V is used to heat water. Time taken to increase the temperature of 100 g water by 50°C is; (specific heat of water = 4200J/kg°C)

(1) 140 s

(2) 270 s

(3) 210 s

(4) 315 s

47. If the escape speed from surface of the earth is v_e, then escape speed form center of earth will be;

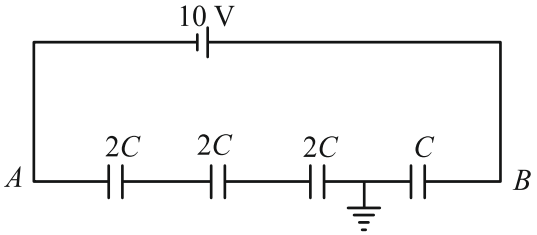
(1) $\sqrt{\frac{3}{2}}v_e$

(2) $\sqrt{\frac{1}{2}}v_e$

(3) $\sqrt{\frac{7}{2}}v_e$

(4) Zero

48. In the circuit shown in figure, potential of points *A* and *B* are respectively;



(1) + 6V, – 4V

(2) $\frac{10}{3}$V, $\frac{20}{2}$V

(3) – 6V, 4V

(4) $-\frac{10}{3}$V, $\frac{20}{2}$V

49. A conducting wire shaped in form of regular hexagon of side 4 cm carries a current of 4 A. Find magnitude of net magnetic field at center of hexagon.

(1) $4\sqrt{3}\times10^{-5}$ T

(2) $6\sqrt{3}\times10^{-5}$ T

(3) $8\sqrt{3}\times10^{-5}$ T

(4) $2\sqrt{3}\times10^{-5}$ T

50. **Assertion (A):** On moving a distance two times of the initial distance, away from an infinitely long straight uniformly charged wire, the electric field is reduced to one third of its initial value.

Reason (R): The electric field is inversely proportional to the distance from a infinitely long straight uniformly charged wire.

(1) Both **Assertion (A)** and **Reason (R)** are true and the **Reason (R)** is the **correct** explanation of the **Assertion (A)**.

(2) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is not the **correct** explanation of the **Assertion (A)**.

(3) **Assertion (A)** is true, **Reason (R)** is false.

(4) **Assertion (A)** is false, **Reason (R)** is true.

(CHEMISTRY)

SECTION-A

51. The sum of all the oxidation states of sulphur atoms in $Na_2S_4O_6$ is;

(1) 4 (2) 10
(3) 6 (4) 7

52. Which of the following statement is/are **correct** about transition metals?

(1) Their compounds are generally coloured
(2) They can form ionic or covalent compounds
(3) Their melting and boiling points are high
(4) All of these

53. Find **true** and **False** from the following statements regarding carbohydrates

S_1: Maltose is a reducing sugar.
S_2: Sucrose is an oligosaccharide.
S_3: A pair of diastereomeric aldoses which differ only in configuration at C-1 are anomers.
S_4: Oxidation of glucose by HNO_3 gives saccharic acid.

(1) TTTT (2) TFTF
(3) FTFT (4) FTTT

54. In Arrhenius equation for a certain reaction, the value of A and E (activation energy) are $4 \times 10^{10} s^{-1}$ and 100 kJ^{-1} mol respectively. If the reaction is of first order, at what temperature will its half-life period be 20 min?

(1) 377.36 K
(2) 366 K
(3) 311.34 K
(4) 200 K

55. The complex ion which is diamagnetic and low spin complex among the following is/are;

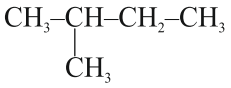
(1) $[Co(H_2O)_6]^{3+}$
(2) $[Co(NH_3)_6]^{3+}$
(3) $[Fe(CN)_6]^{3-}$
(4) $[Cr(H_2O)_6]^{3+}$

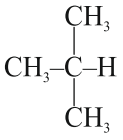
56. Which of the following pair of transition metal ions, have the same calculated values of magnetic moment?

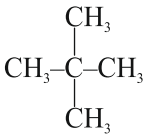
(1) Ti^{2+} and V^{2+}
(2) Fe^{2+} and Cu^{2+}
(3) Cr^{2+} and Fe^{2+}
(4) Co^{2+} and Mn^{2+}

57. In the following compound, maximum number of monochlorination products are possible for;

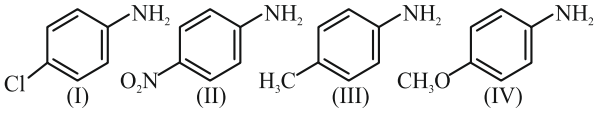
(1) $CH_3CH_2CH_2CH_2CH_3$

(2) 

(3) 

(4) 

58. The **correct** order of increasing basic nature of the following bases is;



(1) II < IV < III < I
(2) II < I < III < IV
(3) I < III < IV < II
(4) II < I < IV < III

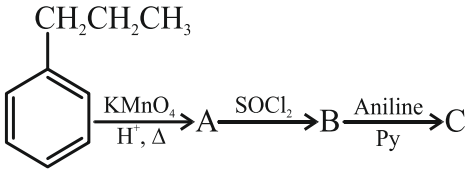
59. A solution weighing 'a' has molality b. The molecular mass of solute if the mass of solute is c g, will be;

(1) $\frac{c}{b} \times \frac{1000}{(a-c)}$

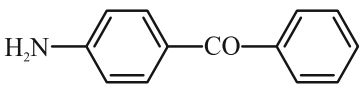
(2) $\frac{b}{a} \times \frac{1000}{(a-b)}$

(3) $\frac{b}{c} \times \frac{1000}{(a-c)}$

(4) $\frac{c}{a} \times \frac{1000}{(b-a)}$

60. 

The major product (C) is;

(1) Benzamide
(2) N-Phenyl benzamide
(3) Benzal aniline
(4) 

61. The **correct** statements about peptides are;
(1) A dipeptide has one peptide link between two amino acids.
(2) By convention N-Terminus is kept at left and C-terminus at right in the structure of a peptide.
(3) If only one amino group and one carboxylic acid, group are available for reaction, then only one dipeptide can forms.
(4) All of these

62. Compound 'A' react with alcoholic KOH to yield compound 'B' which on ozonolysis followed by reaction with Zn/H_2O gives acetone and propanal. Compound 'A' is;
(1) 3-Chloro-2-methylpentane
(2) 3- Chloro-4-methylpentane
(3) 1-Chlorobutane
(4) 2-Chlorobutane

63. **Statement I:** Except CCl_4 other tetrachlorides are easily hydrolyzed by water.
Statement II: Total number of sigma bonds in silicic acid is 8.
(1) Statement I and Statement II both are correct.
(2) Statement I and Statement II both are incorrect.
(3) Statement I is correct, but Statement II is incorrect.
(4) Statement I is incorrect, but Statement II is correct.

64. The energy of second Bohr orbit of the hydrogen atom is –300 kJ mol^{-1}; hence the energy of fifth Bohr orbit would be;
(1) –41 kJ mol^{-1} (2) –48 kJ mol^{-1}
(3) –164 kJ mol^{-1} (4) –82 kJ mol^{-1}

65. **Assertion (A):** Fructose reduces Fehling solution and Tollen's regent.
Reason (R): In fructose the carbonyl group is present at C–2 carbon atom.
(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A).**
(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A).**
(3) **Assertion (A)** is true, but **Reason (R)** is false.
(4) **Assertion (A)** is false, but **Reason (R)** is true.

66. A 10% solution of cane sugar (molar mass 342) is isotonic with 2% solution of an unknown solute. The molar mass of unknown solute in g/mol is;
(1) 136.2 (2) 171.2
(3) 68.4 (4) 34.2

67. From the following compounds which does **not** react with $PhSO_2Cl$?
(1) $(C_2H_5)_3N$
(2) $(CH_3)_3N$
(3) $(CH_3)_2NH$
(4) Both (1) and (2)

68. Select the **correct** statement;
(1) BF_3 and NH_3 have different dipole moment
(2) Dipole moment of NH_3 is greater than that of BF_3
(3) BF_3 molecule has a planar structure, while the NH_3 molecule has pyramidal structure
(4) All of these

69. Resistance of 0.4M solution of an electrolyte is 100 Ω. The specific conductance of the solutions is 2.6 S m^{-1}. If resistance of the 0.8M solution of the same electrolyte is 520 Ω, its molar conductivity is;
(1) 6250 S m^2 mol^{-1}
(2) 6.25×10^{-4} S m^2 mol^{-1}
(3) 625×10^{-4} S m^2 mol^{-1}
(4) 62.5×10^{-4} S m^2 mol^{-1}

70. Which among the following statements are **correct**?
(I) Carbon monoxide is neutral whereas SO_3 is acidic.
(II) Potassium oxide is basic whereas nitrous oxide is neutral.
(III) Aluminium and zinc oxides are amphoteric.
(IV) Sulphur trioxide is acidic whereas phosphorus pentoxide is basic.
(V) Carbon dioxide and sulphur dioxide both are acidic in nature.
The **correct** choice is;
(1) (II) and (III)
(2) (I) and (IV)
(3) (I), (II), (III) and (V)
(4) (II) and (IV)

71. Match **List I** with **List II** and choose the **correct** option.

List I		**List II (Number of moles)**	
(A)	11 g of CO_2	(I)	0.05
(B)	6.022×10^{21} molecules of CO_2	(II)	0.01
(C)	11.2 L of CO_2 at S.T.P	(III)	0.5
(D)	4.9 g of H_2SO_4	(IV)	0.25

(1) A-IV, B-II, C-III, D-I
(2) A-III, B-II, C-IV, D-I
(3) A-II, B-I, C-III, D-IV
(4) A-II, B-III, C-IV, D-I

72. Which of the following process will produce 2° amine?
(1) Gabriel's synthesis
(2) Hoffmann's bromamide reaction
(3) Reduction of carbylamine
(4) Reduction of nitriles

73. Arrange the osmotic pressure of 10% solution of glucose (I), NaCl (II), $BaCl_2$ (III) and $AlCl_3$ (IV) at the same temperature in the ascending order (Assume 100% ionisation of the electrolytes at this temperature);
(1) I < III < II < IV
(2) III < I < II < IV
(3) I< II < III < IV
(4) III < IV < I < II

74. Given, $\frac{l}{A}$ = 1 cm^{-1}, R = 100 ohm, N= 2.0. The equivalent conductance of the electrolytic cell is;
(1) 5 Ω^{-1} cm^2 g $equiv^{-1}$
(2) 20 Ω^{-1} cm^2 g $equiv^{-1}$
(3) 300 Ω^{-1} cm^2 g $equiv^{-1}$
(4) 100 Ω^{-1} cm^2 g $equiv^{-1}$

75. Which of the following has O–O linkage?
(1) CrO_5
(2) $H_2S_2O_8$
(3) $H_2S_2O_3$
(4) Both (1) and (2)

76. For the reaction,
$2NO_2(g) \rightleftharpoons 2NO(g) + O_2(g)$, $K_C = 3.6 \times 10^{-10}$ at 185°C. the value of K_C for the reaction
$NO(g) + \frac{1}{2}O_2(g) \rightleftharpoons NO_2(g)$ is;
(1) 0.9×10^6
(2) 1.9×10^6
(3) 7.5×10^2
(4) 5.27×10^4

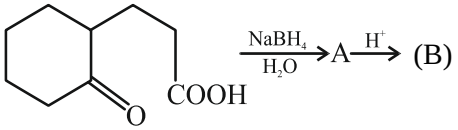
77. The entropy change for the reaction,
$H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$ will be:
[Given that, $S^0(HCl)$ = 190 JK^{-1} mol^{-1}, $S^0(H_2)$ = 130 JK^{-1} mol^{-1} and $S^0(Cl_2)$ = 225 JK^{-1} mol^{-1}];
(1) 25 JK^{-1} mol^{-1}
(2) –20 JK^{-1} mol^{-1}
(3) 167 JK^{-1} mol^{-1}
(4) –167 JK^{-1} mol^{-1}

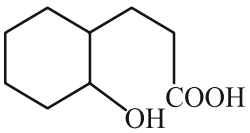
78. Alkyne, C_7H_{12}. when reacted with hot acidic $KMnO_4$ gives a mixture of $(CH_3)_2CHCOOH$ and CH_3CH_2COOH. The alkyne C_7H_{12} is;
(1) 3-Hexyne
(2) 5-Methyl-2-hexyne
(3) 2-Methyl-3-hexyne
(4) 3-Methyl-2-hexyne

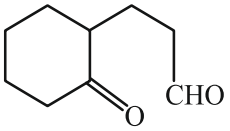
79. $E^{\circ}_{M^{3+}/M} = -0.040\ V$, $E^{\circ}_{M^{2+}/M} = -0.44\ V$.
The value of standard electrode potential for the change $M^{3+}(aq) + e^- \rightarrow M^{2+}(aq)$ will be;
(1) –0.072 V (2) 0.385 V
(3) 0.76 V (4) –0.270 V

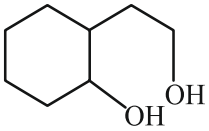
80. NO reacts with O_2 to form NO_2. When 20 g of NO_2 is formed during the reaction, the mass of O_2 consumed is;
(1) 1.90 g (2) 5.0 g
(3) 6.95 g (4) 13.9 g

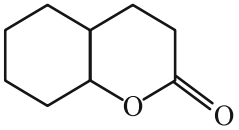
81. The major product (B) in the following reaction is;

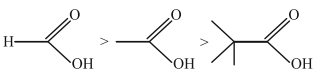


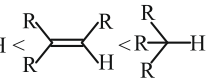
(1) 

(2) 

(3) 

(4) 

82. Consider the following statements;
(I) 2-Chloroethanoic acid is more acidic then ethanoic acid.
(II) Acidic strength of : 

(III) Acidic strength of : 

Select the **correct** statements;
(1) I, II and III
(2) I and II
(3) II and III
(4) I and III

83. 10 litre of water contains 10^{-8} mole H^+ ions. Degree of ionisation of water is;

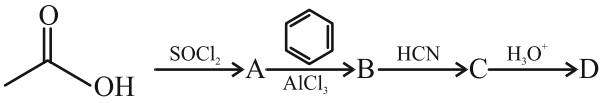
(1) $1.8 \times 10^{-9}\%$

(2) $0.8 \times 10^{-9}\%$

(3) $3.6 \times 10^{-9}\%$

(4) $3.6 \times 10^{-7}\%$

84. In the following sequence of reactions,



The **correct** IUPAC name of product D is;

(1) 2-Hydroxy-2-phenylpropanoic acid

(2) 2-Hydroxy-1-phenylpropanoic acid

(3) 1-Hydroxy-2-phenylpropanoic acid

(4) All of these

85. An alcohol gave Lucas test in about 5 minutes. When the alcohol was treated with hot concentrated H_2SO_4 it gave an alkene of molecular formula C_4H_8 which on ozonolysis gave C_2H_4O. The structure of alcohol is?

(1) $CH_3CHOHCH_2CH_3$

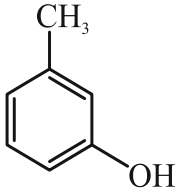
(2) $CH_3CH_2CH_2CH_2OH$

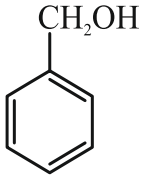
(3) $CH_3CHOHCH_2CH_2CH_3$

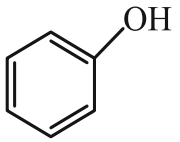
(4) $(CH_3)_3C–OH$

SECTION-B

86. The structure of the compound that gives a tribromo derivative on reaction with bromine water is;

(1) 

(2) 

(3) 

(4) Both (1) and (3)

87. How much of sulphur is present in an organic compound if 0.59 g of the compound gave 1.20 g of $BaSO_4$ on analysis?

(1) 10%

(2) 15%

(3) 20%

(4) 27.93%

88. Which of the following species is paramagnetic in nature?

(1) N_2^+

(2) O_2

(3) O_2^{2-}

(4) Both (1) and (2)

89. A gas expands isothermally against a constant pressure of 2 atm from a volume of 20 dm^3 to a volume of 40 dm^3. It absords 1600 J of thermal energy from its surrounding. Then ΔU is;

(1) –312 J

(2) + 2452 J

(3) –2452 J

(4) + 2440 J

90. In the fourth energy level, the number of orbital are;

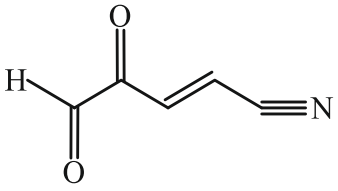
(1) 16

(2) 8

(3) 7

(4) 6

91. The hybridization of carbon atom in the following compound from left to right is;



(1) sp, sp^3, sp^2, sp^2, sp

(2) sp^2, sp^2, sp^2, sp^2, sp

(3) sp, sp^2, sp^2, sp^2, sp^2

(4) sp^2, sp^2, sp, sp^2, sp^2

92. For a reaction between gaseous compounds, $2A + B \rightarrow C + D$: the reaction rate law is rate = k[A][B]. If the volume of the container is made $\frac{1}{8^{th}}$ of the initial, then what will be the rate of reaction as compared to the initial rate?

(1) 64 times

(2) 4 times

(3) $\frac{1}{8}$ times

(4) $\frac{1}{16}$ times

93. Consider the following reactions:

(I) $O_{(g)} + e^- \rightarrow O^-_{(g)}, \Delta H_1$

(II) $F_{(g)} + e^- \rightarrow F^-_{(g)}, \Delta H_2$

(III) $Cl_{(g)} + e^- \rightarrow Cl^-_{(g)}, \Delta H_3$

(IV) $N_{(g)} + e^- \rightarrow N^-_{(g)}, \Delta H_4$

Then according to given information the **correct** statement is/are;

(1) ΔH_3 is more negative than ΔH_1 and ΔH_2

(2) ΔH_1 is less negative than ΔH_2

(3) ΔH_1, ΔH_2 and ΔH_3 are negative whereas ΔH_4 is positive

(4) All of these

94. For the reaction,

$2H_2(g) + 2CO_2(g) \rightleftharpoons 2CO(g) + 2H_2O(g)$. If the initial concentration of $[H_2] = [CO_2] = 2$ and y mole/L of hydrogen is consumed at equilibrium, the **correct** expression of K_C is;

(1) $\frac{y^4}{(2-y)^4}$

(2) $\frac{(1+y)^2}{(1-y)^2}$

(3) $\frac{y^2}{(2+y)^2}$

(4) $\frac{y^2}{1-y^2}$

95. Which of the following reactions will give an alkyne?

(1) $CH_3CBr_2CHBr_2 \xrightarrow{Zn\ dust}$

(2) $CH_3CH_2CHBr_2 \xrightarrow{alc.KOH} A \xrightarrow{NaNH_2} B$

(3) $CH_3CHBrCH_2Br \xrightarrow[2\ eq.]{NaNH_2}$

(4) All of these

96. Oxidation of alcohol with $KMnO_4$ gives an acid of molecular formula $C_3H_6O_2$. On heating $C_3H_6O_2$ with sodalime, the gas evolved will be;

(1) C_2H_2

(2) CH_4

(3) C_2H_6

(4) C_2H_4

97. **Assertion (A):** Basicity of pyrophosphoric acid is four.

Reason (R): The number of P–O–P bonds in pyrophosphoric acid is two.

(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A).**

(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A).**

(3) **Assertion (A)** is true, but **Reason (R)** is false.

(4) **Assertion (A)** is false, but **Reason (R)** is true.

98. **Statement I:** Total number of lone pair in sulphurous acid is six.

Statement II: Number of coordinate bond in sulphurous acid is two.

(1) Statement I and Statement II both are correct.

(2) Statement I and Statement II both are incorrect.

(3) Statement I is correct, but Statement II is incorrect.

(4) Statement I is incorrect, but Statement II is correct.

99. Match **List I** with **List II** and choose the **correct** option.

List I (Compounds)		**List II (Oxidation state of central atom)**	
(A)	Fe_3O_4	(I)	+6
(B)	P_4O_{10}	(II)	$+\frac{4}{3}$
(C)	C_3O_2	(III)	+5
(D)	CrO_5	(IV)	$+\frac{8}{3}$

(1) A-IV, B-III, C-II, D-I

(2) A-III, B-II, C-IV, D-I

(3) A-II, B-I, C-III, D-IV

(4) A-II, B-III, C-IV, D-I

100. Which one of the following groups represents a collection of isoelectronic species?

(Atomic No. : Cs = 55. Br = 35)?

(1) Ca^{2+}, Cl^-, S^{2-}

(2) Na^+, K^+, Mg^{2+}

(3) N^{3-}, F^-, Na^+

(4) Both (1) and (3)

(BOTANY)

SECTION-A

101. _____is the type of pollination which is a cross pollination functionally but self pollination genetically.
(1) Autogamy
(2) Geitonogamy
(3) Xenogamy
(4) Cleistogamy

102. Identify the **mismatched** pair w.r.t the steps of EMP pathway.

(1)	3-phosphoglyceraldehyde is converted to 1, 3-bisphosphoglycerate	NADH + H^+ is formed
(2)	Conversion of glucose into glucose 6-phosphate	ADP is utilised
(3)	Fructose 6-phosphate to fructose 1, 6-bisphosphate	ATP is utilised
(4)	Conversion of BPGA to 3-phosphoglyceric acid	ATP is formed

103. Identify the **incorrect** statement w.r.t factors affecting photosynthesis.
(1) The internal factors which affect photosynthesis are dependent on the genetic predisposition of the plant.
(2) Despite the presence of a green leaf and optimal light and CO_2 conditions, the plant may not photosynthesis if the temperature is very low.
(3) Increase in concentration of CO_2 upto 0.05 per cent can cause an increase in CO_2 fixation rates.
(4) At low light conditions both C_3 and C_4 plants respond to high CO_2 conditions.

104. **Assertion** (A): The endomembrane system includes endoplasmic reticulum (ER), golgi complex, lysosomes and vacuoles.
Reason (R): The functions of endoplasmic reticulum (ER), golgi complex, lysosomes and vacuoles are coordinated.
(1) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true and **Reason (R)** is false.
(4) **Assertion (A)** is false and **Reason (R)** is true.

105. Identify the cell which is **not** devoid of protoplasm.
(1) Vessels
(2) Tracheids
(3) Xylem Parenchyma
(4) Sclerenchyma

106. The gas which is predominantly present in biogas is;
(1) methane.
(2) carbon dioxide.
(3) hydrogen sulphide.
(4) ethane.

107. Match **List-I** with **List-II** choose the **correct** option.

List-I (Pea plant character)		**List-II (Recessive trait)**	
(I)	Pod shape	(A)	Wrinkled
(II)	Pod colour	(B)	Yellow
(III)	Seed shape	(C)	Green
(IV)	Seed colour	(D)	Constricted

	I	**II**	**III**	**IV**
(1)	C	D	A	B
(2)	A	B	D	C
(3)	B	D	C	A
(4)	D	B	A	C

108. In the process of meiosis-I, terminalisation of chiasmata occurs during _____ stage.
(1) leptotene (2) diakinesis
(3) zygotene (4) diplotene

109. Identify the classes of fungi in which mycelium is branched and septate & choose the **correct** option.
(1) Phycomycetes and ascomycetes
(2) Basidiomycetes and phycomycetes
(3) Ascomycetes and deuteromycetes
(4) Basidiomycetes and phycomycetes

110. **Statement I:** The term linkage is used to describe the physical association of genes on a chromosome.
Statement II: The term recombination is used to describe the generation of non-parental gene combinations.
(1) Statement I and Statement II both are correct.
(2) Statement I is correct but Statement II is incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

111. If glycolysis starts with sucrose as the substrate then the number of molecule(s) of pyruvic acid formed is/are;
(1) 1. (2) 2.
(3) 3. (4) 4.

112. The factor that is responsible for extension growth of plant cells is;
(1) optimum temperature.
(2) oxygen.
(3) water.
(4) nutrients.

113. **Statement I:** In some organisms, karyokinesis is not followed by cytokinesis as a result of which a multinucleate condition arises leading to the formation of syncytium.
Statement II: Cell growth disturbs the ratio between the nucleus and the cytoplasm.
(1) Statement I and Statement II both are correct.
(2) Statement I is correct but Statement II is incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

114. **Assertion (A):** The respiratory pathway is better to be considered as an amphibolic pathway rather than as a catabolic one.
Reason (R): The respiratory pathway is involved in both anabolism and catabolism.
(1) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true and **Reason (R)** is false.
(4) **Assertion (A)** is false and **Reason (R)** is true.

115. Identify the **incorrect** statement w.r.t the ABO blood group system in humans.
(1) AB blood group is the case of co-dominance in which the F_1 generation resembles both parents.
(2) ABO blood groups are controlled by the gene *I*, which has three alleles I^A, I^B and *i*.
(3) The alleles I^A and I^B produce a slightly different form of sugar from the sugar produced by allele *i*.
(4) There is a total of six different possible genotypes of the human ABO blood types.

116. Read the given statements and choose the **correct** option w.r.t the group of plants.
A. Grow in moist shaded areas.
B. Can live in soil but are dependent on water for sexual reproduction.
C. The plant body is thallus-like and prostrate or erect.
D. The main plant body is gametophyte.
E. They prevent soil erosion.
(1) Algae (2) Pteridophytes
(3) Bryophytes (4) Gymnosperms

117. The male gametes of rice plant have 10 chromosomes in their nucleus. The chromosome number in the female gamete, zygote and the cells of the seedling will be, respectively:
(1) 10, 20 and 10.
(2) 20, 10 and 10.
(3) 10, 20 and 20.
(4) 20, 10 and 20.

118. In most situations, ABA acts as an antagonist to:
(1) auxin. (2) GAs.
(3) cytokinin. (4) ethylene.

119. Identify the **correct** statement w.r.t structure of polynucleotide chain in nucleic acids.
(1) Thymine is common for both DNA and RNA and Cytosine is present in DNA.
(2) A nitrogenous base is linked to the H of pentose sugar to form a nucleoside.
(3) When a phosphate group is linked to OH of 5'C of a nucleotide, a corresponding nucleoside is formed.
(4) The backbone of a polynucleotide chain is formed due to sugar and phosphates.

120. Read the following statements w.r.t of population attributes and choose the **correct** option.
A. A population at any given time is composed of individuals of different ages.
B. The size of a population for any species is a static parameter.
C. Immigration is the number of individuals of the population who left the habitat and gone elsewhere during a particular time period.
(1) A and B are correct and C is incorrect.
(2) A and C are correct and B is incorrect.
(3) A is correct and B and C are incorrect.
(4) B is correct and A and C are incorrect.

121. If fatty acids were to be respired they would first be degraded to_____ and enter the pathway.
(1) PGAL
(2) glycerol
(3) acetyl CoA
(4) dihydroxyacetone phosphate

122. In human beings, the membrane of the erythrocyte has approximately;
(1) 40 percent lipids and 52 percent carbohydrates.
(2) 40 percent protein and 52 percent lipids.
(3) 40 percent lipids and 52 percent proteins.
(4) 40 percent protein and 52 percent carbohydrates.

123. Match **List-I** with **List-II** find out the **correct** option.

List-I		List-II	
(I)	Exon	(A)	Non-coding sequence
(II)	Intron	(B)	Coding sequence
(III)	Capping	(C)	Polyadenylation
(IV)	Tailing	(D)	Methyl guanosine triphosphate

	I	II	III	IV
(1)	C	D	A	B
(2)	A	B	C	D
(3)	B	A	D	C
(4)	B	D	A	C

124. In stems;

(1) protoxylem lies towards centre and metaxylem towards periphery, called endarch type of primary xylem.

(2) protoxylem lies towards centre and metaxylem towards periphery, called exarch type of primary xylem.

(3) metaxylem lies towards centre and protoxylem towards periphery called endarch type of primary xylem.

(4) metaxylem lies towards centre and protoxylem towards periphery called exarch type of primary xylem.

125. Read the following and identify them as **true (T)** or **false (F)** statements.

A. Dinoflagellates have two flagella; one lies tangentially and the other longitudinally in a furrow between the wall plates.

B. In slime moulds, the plasmodium differentiates and forms fruiting bodies bearing spores at their tips.

C. The walls of diatoms are embedded with nickel and thus the walls are indestructible.

D. *Plasmodium* (malarial parasite) is a sporozoan.

	A	B	C	D
(1)	T	T	F	T
(2)	T	F	T	T
(3)	F	T	F	T
(4)	F	T	T	T

126. Identify the **incorrect** statement from the following w.r.t mosses.

(1) In the life cycle of mosses, the first stage is the protonema stage, which develops directly from a gamete.

(2) In the life cycle of mosses ,second stage is the leafy stage, which develops from the secondary protonema as a lateral bud.

(3) Vegetative reproduction in mosses is by fragmentation and budding in the secondary protonema.

(4) The sporophyte in mosses is more elaborate than that in liverworts.

127. Match the **List-I** with **List-II** to find out the **correct** option.

List-I		List-II	
(I)	Ascomycetes	(A)	*Colletotrichum*
(II)	Phycomycetes	(B)	*Neurospora*
(III)	Basidiomycetes	(C)	*Albugo*
(IV)	Deuteromycetes	(D)	*Ustilago*

	I	II	III	IV
(1)	B	C	D	A
(2)	A	B	C	D
(3)	D	C	A	B
(4)	B	C	A	D

128. The enzyme that inhibits transformation of R cells in Oswald Avery, Colin MacLeod and Maclyn McCarty's experiment, was;

(1) protease.

(2) RNase.

(3) DNase.

(4) lipase.

129. **Statement I:** AUG has dual functions. It codes for Methionine (met) and also acts as initiator codon.
Statement II: UAA, UAG, UGG are stop terminator codons.

(1) Statement I and Statement II both are correct.

(2) Statement I is correct but Statement II is incorrect.

(3) Statement I is incorrect but Statement II is correct.

(4) Statement I and Statement II both are incorrect.

130. The annual net primary productivity (dry weight) of the whole biosphere is approximately;

(1) 55 billion tons

(2) 170 billion tons

(3) 155 billion tons

(4) 165 billion tons

131. Read the following statements carefully and select the **correct** ones.

A. Inclusion bodies are not bound by any membrane system and lie free in the nucleoplasm.

B. All eukaryotic cells are not identical.

C. Both the cilium and flagellum emerge from centrioles called the basal bodies.

D. The materials to be packaged from ER fuse with the *trans* face of the golgi apparatus and move towards the maturing face.

(1) A and C

(2) C and D

(3) B and C

(4) A and D

132. **Assertion (A):** The possibility of a female becoming a haemophilic is extremely rare.
Reason (R): Mother of a haemophilic female has to be at least carrier and the father should be haemophilic.
(1) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true and **Reason (R)** is false.
(4) **Assertion (A)** is false and **Reason (R)** is true.

133. The green expanded part of the leaf with veins and veinlets is;
(1) pulvinus. (2) leaf base.
(3) petiole. (4) leaf blade.

134. _____ is the substrate for the enzyme beta-galactosidase and it regulates switching on and off of the *lac* operon.
(1) Glucose
(2) Fructose
(3) Galactose
(4) Lactose

135. Identify the **correct** match w.r.t C_4 pathway in plants.
(1) Presence of PEP - Mesophyll cell
(2) Regeneration of PEP - Bundle sheath cell
(3) Fixation of CO_2 by Calvin cycle - Mesophyll cell
(4) C_4 acid formation - Bundle sheath cell

SECTION-B

136. Read the following statements w.r.t decomposition by microbes and select how many statement(s) is/are **correct**?
A. Detritivores break down detritus into smaller particles. This process is called fragmentation.
B. By the process of catabolism, water- soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts.
C. Bacterial and fungal enzymes degrade detritus into simpler inorganic substances. This process is called as leaching.
D. The humus is degraded by some microbes and release of inorganic nutrients occur by the process known as mineralisation.
(1) One (2) Three
(3) Two (4) Four

137. According to recent extinctions which one is **incorrectly** matched pair?
(1) Dodo - Mauritius
(2) Steller's sea cow - Java
(3) Quagga - Africa
(4) Thylacine - Australia

138. India now has _____biosphere reserves, _____ national parks and _____ wildlife sanctuaries, respectively.
(1) 25, 34, 448
(2) 448, 90, 14
(3) 34, 25, 90
(4) 14, 90, 448

139. **Assertion (A):** According to the chemiosmotic hypothesis, as protons move through the photosystems, electron are transported across the membrane.
Reason (R): The primary accepter of electron which is located towards the outer side of the membrane transfers its electron not to an electron carrier but to an H carrier.
(1) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true and **Reason (R)** is false.
(4) **Assertion (A)** is false and **Reason (R)** is true.

140. Identify the **incorrect** statement w.r.t G_0 phase.
(1) It is also known as quiescent stage.
(2) Cell of this stage remain metabolically inactive.
(3) There is no longer proliferation in the cells which are present in this stage, unless called to do so.
(4) Heart cells in animals exhibit in this stage.

141. **Statement I:** Xylem fibres have highly thickened walls and obliterated peripheral lumens.
Statement II: The radial conduction of water takes place by the ray parenchymatous cells.
(1) Statement I and Statement II both are correct.
(2) Statement I is correct but Statement II is incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

142. Identify the cell organelle that is surrounded by a single membrane.

(1) Ribosome
(2) Mitochondria
(3) Lysosome
(4) Nucleus

143. Identify the **incorrect** statement.

(1) Both the species benefit in mutualism and both lose in competition in their interactions with each other.
(2) Biological control methods are based on the ability of the predator to regulate prey population.
(3) Totally unrelated species could not compete for the same resource.
(4) The life cycles of endoparasites are more complex because of their extreme specialisation.

144. Identify the **true** statement w.r.t rhodophyceae.

(1) The members of rhodophyceae are commonly called brown algae.
(2) They occur in both well-lighted regions and also at great depths in oceans.
(3) The food is stored as floridean starch very similar to glucose in structure.
(4) Sexual reproduction is oogamous and accompanied by complex pre-fertilisation developments.

145. **Assertion (A):** Spraying sugarcane crop with gibberellins increases the length of the stem,
Reason (R): Gibberellins increase the yield of sugarcane by as much as 20 tonnes per meter.

(1) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true and **Reason (R)** is false.
(4) **Assertion (A)** is false and **Reason (R)** is true.

146. Match the **List-I** with **List-II** to find out the **correct** option.

List-I		List-II	
(I)	Epipetalous	(A)	Pea
(II)	Polyadelphous	(B)	Brinjal
(III)	Diadelphous	(C)	Citrus
(IV)	Monoadelphous	(D)	China rose

	I	II	III	IV
(1)	A	D	C	B
(2)	D	B	C	A
(3)	B	A	D	C
(4)	B	C	A	D

147. Identify the **incorrect** statement.

(1) Biofertilisers are organisms that enrich the nutrient quality of the soil.
(2) The main sources of biofertilisers are bacteria, fungi and cyanobacteria.
(3) Fungi are known to form symbiotic associations with animals called mycorrhiza.
(4) Many members of the genus *Glomus* form mycorrhiza.

148. Match the **List-I** with **List-II** to find out the **correct** option.

List-I		List-II	
(I)	Scutellum	(A)	Radical enclosed in an undifferentiated sheath
(II)	Coleoptile	(B)	Terminates with the stem tip
(III)	Coleorrhiza	(C)	Large shield-shaped structure
(IV)	Epicotyl	(D)	Leaf primordia enclosed in a hollow foliar structure

	I	II	III	IV
(1)	C	D	B	A
(2)	A	B	C	D
(3)	C	D	A	B
(4)	B	C	A	D

149. **Statement I:** One of the problems of hybrids is that hybrid seeds have to be produced in every two year.
Statement II: Cultivation of hybrids has tremendously increased productivity.

(1) Statement I and Statement II both are correct.
(2) Statement I is correct but Statement II is incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

150. Identify the **incorrectly** matched pair w.r.t taxon and their taxonomic categories.

(1) *Felis* - Genus
(2) *Panthera* - Family
(3) Mammalia - Class
(4) Chordata - Phylum

(ZOOLOGY)

SECTION-A

151. The most feared property of malignant tumors is;
(1) metastasis.
(2) being confined to original location.
(3) contact inhibition exhibited by cells.
(4) neoplastic transformation.

152. In the example of industrial melanism during 'P' period, the tree trunks became dark and 'Q' moth survived.
Identify **'P'** and **'Q'** and select the **correct** option.

	P	Q
(1)	Pre-industrialisation	White-winged
(2)	Post- industrialisation	Dark-winged
(3)	Post- industrialisation	White-winged
(4)	Pre-industrialisation	Melanised

153. Which of the following would be most useful for increasing the amount of DNA available for testing?
(1) Agarose gel electrophoresis
(2) ELISA
(3) Downstream processing
(4) PCR

154. In India, the permissible use of amniocentesis is for;
(1) detecting any genetic abnormality.
(2) detecting sex of the unborn baby.
(3) artificial insemination.
(4) transfer of embryo into the uterus of a surrogate mother.

155. Presence of dry and cornified skin, epidermal scales or scutes are characters of organisms belonging to which taxon?
(1) Cyclostomata
(2) Reptilia
(3) Pisces
(4) Amphibia

156. A number of muscle bundles are held together by a common _____ tissue layer called fascia.
Select the option that **correctly** fills the blank.
(1) Epithelial (2) Neural
(3) Muscular (4) Connective

157. All of the following are involved in selective secretion of hydrogen ions **except;**
(1) PCT
(2) Loop of Henle
(3) DCT
(4) Collecting duct

158. Select the **incorrect** statement from the following.
(1) Cleavage is a series of mitotic divisions as zygote moves through the isthmus of the oviduct.
(2) The number of chromosomes in each blastomere of morula and blastula is same.
(3) Implantation occurs in the outermost layer of uterus.
(4) Inner cell mass contains certain cells called stem cells that have the potency to develop other organs.

159. During the process of ultrafiltration, all of the given constituents of plasma can pass on to the lumen of Bowman's capsule, **except;**
(1) Lipids
(2) Glucose
(3) Albumin
(4) Minerals

160. The amount of CO_2 delivered by 5L of deoxygenated blood to the alveoli is;
(1) 20 mL
(2) 2 mL
(3) 200 L
(4) 200 mL

161. Choose the **incorrect** statement for simple epithelial tissues in humans.
(1) It is composed of a single layer of cells.
(2) It functions as a lining for body cavities, ducts and tubes.
(3) On the basis of structural modification of cells, it is divided into three types.
(4) It covers the dry surface of the skin.

162. Select the **correct** option w.r.t the composition of thyroid gland.
(1) Follicles and lymphoid mass
(2) Follicles and stromal tissues
(3) Stromal tissues and cartilage
(4) Follicles and cartilage

163. While performing chemical analysis of a living tissue, which of the following acids is required for grinding?
(1) Hydrochloric acid
(2) Trichloroacetic acid
(3) Sulphuric acid
(4) Acetic acid

164. All of the following are the common reasons for producing transgenic animals, **except**;
(1) To study normal physiology and development.
(2) Vaccine safety.
(3) Chemical safety testing.
(4) Early diagnosis of diseases.

165. Select the **incorrect** statement w.r.t synapse.
(1) Synapse is formed by the membranes of a pre-synaptic neuron and a post-synaptic neuron.
(2) Synaptic membranes are always separated by a gap called synaptic cleft.
(3) Electrical synapses are rare in our system.
(4) In chemical synapse, neurotransmitters are involved in the transmission of impulses.

166. Lubrication of the penis is the function of secretion of which male accessory gland(s)?
(1) Bulbourethral glands
(2) Bartholin's glands
(3) Seminal vesicles
(4) Prostate gland

167. Select the **odd one** among the following w.r.t marine habitat.
(1) *Labeo*
(2) *Exocoetus*
(3) *Trygon*
(4) *Carcharodon*

168. A triploblastic, pseudocoelomate animal among the following is;
(1) *Wuchereria*
(2) *Fasciola*
(3) *Hirudinaria*
(4) *Anopheles*

169. Select the **odd** one among the following w.r.t. structures present within testis.
(1) Rete testis
(2) Seminiferous tubules
(3) Testicular lobules
(4) Vas deferens

170. Which of the following hormones is **not** produced by pars distalis?
(1) ACTH (2) MSH
(3) FSH (4) PRL

171. Which of the following methods is advised as a terminal method to prevent any more pregnancies?
(1) IVF (2) Implant
(3) Tubectomy (4) IUDs

172. Choose the **incorrect** match.
(1) Total thickness of diffusion membrane - Less than a millimetre
(2) Solubility of CO_2 in blood - 20-25 times higher than of O_2
(3) Percentage of CO_2 carried in a dissolved state through plasma - Equal to the percentage of eosinophils in total WBCs
(4) Volume of functional residual capacity - More than the volume of expiratory capacity

173. Fish with stout and strong fins could move on land and go back to water about 350 mya. Which of the following also occur around 350 mya?
(1) Evolution of jawless fish.
(2) Existence of few plants and sea weeds.
(3) Formation of invertebrates.
(4) Disappearance of dinosaurs.

174. Which of the following is present in the middle of each 'I' band?
(1) M-line (2) H-zone
(3) A- band (4) Z-line

175. Read the following from **A**-**C** and select the **correct** ones for *Agrobacterium tumefaciens*.
A. Infects plants and animals.
B. Is a natural genetic engineer.
C. Is a disease-causing bacterium, in plants only.
(1) A only (2) B and C only
(3) A and C only (4) C only

176. Match **List-I** with **List-II** and choose the **correct** option.

List-I		**List-II**	
(A)	*Haemophilus influenzae*	(I)	Common cold
(B)	*Rhino virus*	(II)	Elephantiasis
(C)	*Wuchereria malayi*	(III)	Pneumonia
(D)	*Plasmodium falciparum*	(IV)	Malignant malaria

	A	**B**	**C**	**D**
(1)	III	I	II	IV
(2)	I	II	III	IV
(3)	III	IV	II	I
(4)	I	III	II	IV

177. During a cardiac cycle, each ventricle pumps out approximately 70 mL of blood which is called;
(1) cardiac output.
(2) end systolic volume.
(3) end diastolic volume.
(4) stroke volume.

178. On an average, a female cockroach produces how many oothecae?
(1) 14-16 (2) 9-10
(3) 25-30 (4) 90-100

179. Consider the given statements.
A. Mary Mallon was a typhoid carrier who spread typhoid for several years through food.
B. Rheumatoid arthritis is an autoimmune disease.
C. Interferons act as cellular barriers to protect non-infected cells.
D. HIV is an enveloped virus enclosing RNA genome.
Choose the **correct** set with correct statements.
(1) Only A, B and C
(2) Only A, B and D
(3) Only B, C and D
(4) A, B, C and D

180. Why host bacterial cells are treated with specific concentration of divalent cations in recombinant DNA technology?
(1) To isolate DNA from the cells.
(2) To make cells competent for the uptake of recombinant DNA.
(3) To culture the host cells in a medium at large scale.
(4) To extract a desired product.

181. Identify the structure of brain which consists of fibre tracts that interconnect different regions of the brain.
(1) Corpora quadrigemina
(2) Cerebral aqueduct
(3) Limbic lobe
(4) Pons

182. The drugs that are used as medicines to help patients cope with mental illnesses like insomnia does **not** include;
(1) Cocaine (2) Amphetamines
(3) Barbiturates (4) Benzodiazepines

183. In which of the following animal kidneys do not play any significant role in removal of nitrogenous waste?
(1) *Canis* (2) *Clarias*
(3) *Felis* (4) *Delphinus*

184. Choose the **incorrect** statement.
(1) Asthma is attributed only to bacterial infection of lungs.
(2) Reduction in pH of blood will decrease the affinity of haemoglobin with oxygen.
(3) Minute quantities of carbonic anhydrase is present in plasma.
(4) Cigarette smoking may leads to damage in alveolar walls.

185. Who proposed embryological support for evolution?
(1) Louis Pasteur
(2) Ernst Haeckel
(3) Alfred Wallace
(4) Thomas Malthus

SECTION-B

186. **Statement I:** *Salmonella typhi* is a pathogenic bacterium which causes typhoid fever in human beings.
Statement II: *Streptococcus pneumoniae* and *Haemophilus influenzae* are responsible for the disease pneumonia in humans which infects the liver.
(1) Both statement I and statement II are correct.
(2) Both statement I and statement II are incorrect.
(3) Statement I is correct but statement II is incorrect.
(4) Statement I is incorrect but statement II is correct.

187. Match **List-I** with **List-II** and choose the **correct** option.

List-I		**List-II**	
(A)	Gametogenesis	(I)	Attachment of blastocyst to uterine wall
(B)	Insemination	(II)	Release of sperm into female genital tract
(C)	Ejaculation	(III)	Formation of sperms and ova
(D)	Implantation	(IV)	Release of sperms out of the male body

	A	**B**	**C**	**D**
(1)	II	III	IV	I
(2)	III	IV	II	I
(3)	IV	II	III	I
(4)	III	II	IV	I

188. **Assertion (A):** In frog, a triangular structure called sinus venosus joins the right atrium.
Reason (R): Ventricle opens into a saclike conus arteriosus on the dorsal side of the heart.
(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true, and **Reason (R)** is false.
(4) **Assertion (A)** is false, and **Reason (R)** is true.

189. **Assertion (A):** Pouched mammals survived and flourished in Australia.
Reason (R): There was a lack of competition from any other mammal to pouched mammals of Australia due to continental drift.
(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true, and **Reason (R)** is false.
(4) **Assertion (A)** is false, and **Reason (R)** is true.

190. Select the **incorrect** statement w.r.t circulatory system of humans.
(1) A special neural centre in the medulla oblongata can moderate the cardiac function through ANS.
(2) If repeated checks of blood pressure of an individual is 120/80, it shows hypertension.
(3) The electrical activity of the heart can be recorded from the body surface by using electrocardiograph.
(4) Heart is situated in the thoracic cavity, in between the two lungs, slightly tilted to the left.

191. Select the **correct** match.
(1) Embryo's heart is formed - After 1st trimester of pregnancy
(2) Foetus develops limbs and digits - By the end of 6 weeks
(3) First movements of foetus - During the 5th month of pregnancy
(4) Foetal head covered with fine hair - After 12th weeks of gestation

192. Select the **correct** statement w.r.t *Sycon*, blue whale and penguin.
(1) *Sycon* is fresh water invertebrate while others are marine animals.
(2) Penguin and *Sycon* are homoiotherms while blue whale is poikilotherms.
(3) Fertilisation is internal in all of them.
(4) All are bilaterally symmetrical.

193. **Statement I** : If an alien DNA is inserted at Pst I site of cloning vector pBR322 then the recombinants are amp^R and tet^R.
Statement II: Restriction enzymes cut the DNA strand a little away from the centre of the palindrome sites but between the same two bases on the opposite strand.
(1) Both statement I and statement II are correct.
(2) Both statement I and statement II are incorrect.
(3) Statement I is correct but statement II is incorrect.
(4) Statement I is incorrect but statement II is correct.

194. Select the **incorrect** statement w.r.t. urine formation.
(1) The first step in urine formation is the filtration of blood.
(2) The muscular cells of Bowman's capsule called podocytes are arranged in an intricate manner.
(3) Tubular secretion helps in the maintenance of ionic and acid-base balance of body fluids.
(4) GFR in a healthy individual is approximately 125 mL/min.

195. **Assertion (A):** Lungs are covered by a double layered pleura, with pleural fluid between them.
Reason (R): Pleural fluid increase friction on the lung-surface.
(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true, and **Reason (R)** is false.
(4) **Assertion (A)** is false, and **Reason (R)** is true.

196. Match **List-I** with **List-II** and choose the **correct** option regarding hormones and their chemical nature.

List-I		**List-II**	
(A)	Estradiol	(I)	Amino-acid derivative
(B)	Thyroxine	(II)	Peptide
(C)	Epinephrine	(III)	Iodothyronine
(D)	Glucagon	(IV)	Steroid

	A	**B**	**C**	**D**
(1)	IV	III	II	I
(2)	IV	III	I	II
(3)	III	I	II	IV
(4)	IV	I	III	II

197. Select the **incorrect** match w.r.t. the type of joint with its example in human skeletal system.

	Type of joint		**Example**
(1)	Saddle joint	-	Between carpal and metacarpal of thumb
(2)	Pivot joint	-	Between atlas and axis
(3)	Hinge joint	-	Between humerus and pectoral girdle
(4)	Gliding joint	-	Between the carpals

198. **Assertion (A)**: The neural system of all animals is composed of highly specialised cells called neurons.
Reason (R): Neurons can detect, receive and transmit different kinds of stimuli.

(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true, and **Reason (R)** is false.
(4) **Assertion (A)** is false, and **Reason (R)** is true.

199. **Assertion (A)**: The method of producing thousands of plants through tissue culture is called totipotency.
Reason (R): Sucrose is the carbon source of nutrient medium used in tissue culture.

(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true, and **Reason (R)** is false.
(4) **Assertion (A)** is false, and **Reason (R)** is true.

200. **Assertion (A)**: A survey of animal kingdom presents a variety of excretory structures.
Reason (R): Protonephridia, nephridia, malpighian tubules and green glands only eliminate nitrogenous wastes in animals.

(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true, and **Reason (R)** is false.
(4) **Assertion (A)** is false, and **Reason (R)** is true.

■■■

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